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Searching for millicharged particles with scintillator based detectors

The successful search for millicharged particles with the milliQan demonstrator has proved the feasibility the detector design as well as providing important lessons for background mitigation and signal performance. For Snowmass, we are planning a publication that will use data and fully calibrated simulation from the demonstrator to provide projections for the reach of full-scale scintillator-based detectors at the LHC and neutrino beam sources (e.g. DUNE, J-PARC). As detailed in the letter of intent (https://www.snowmass21.org/docs/files/summaries/EF/SNOWMASS21-EF9_EF0-NF3_NF0-RF6_RF0_Matthew_Citron-072.pdf) submitted to EF09, this effort will include a comprehensive evaluation of the dominant backgrounds and how they may be mitigated, as well as a full consideration of the performance for signal. On behalf of those involved in this Snowmass project and the milliQan collaboration, I will briefly summarise how scintillator based detectors can be used to search for millicharged particles and how the sensitivity of such detectors at a range of sites will be evaluated.

Primary frontier topic

Energy Frontier

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